

Photometric Observations of Known Spectroscopic Binaries

Kepler 2 Field 0 Proposal

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The prime Kepler Mission has clearly demonstrated its ability to discover and characterize planets around other stars and stellar binaries and multiples of all kinds. **We propose to observe ~50 known spectroscopic binaries** to search for eclipses and possible circumbinary planets.

This proposal is one of multiple similar proposals aimed at identifying known binary stars in the fields in a variety of ways. These systems were identified using the Binary Star Database (BDB) at <http://bdb.inasan.ru/> (Kaygorodov et al. 2012), which is itself a collection from many sources. Most stars identified in this list are from the SB9 catalog of spectroscopic binaries with known periods less than a few thousand days. Some are from other catalogs and/or are already known to eclipse. We identified all known BDB systems within 12 degrees of the proposed Field 0 boresight (RA (J2000) = 06^h 47^m 00^s, Dec (J2000) = +21° 22' 47").

By targeting known binary stars, the probability of detecting eclipses, or other star-star induced variability (e.g., ellipsoidal variations) is much higher than picking a random field star. Hence, the science yield is likely to be much higher. Recall that the Kepler Eclipsing Binary Working Group (of which Ragozzine is a member) and others have already produced dozens of important papers regarding stellar properties, binary probabilities, circumbinary planets, and a variety of other science. These targets have a high probability of similar scientific returns.

Furthermore, the proposed targets are doubly valuable due to pre-existing data and analysis. Binaries identified from lists of known binaries must already have significant radial velocity or eclipsing binary solutions. This will enhance the understanding and interpretation of any Kepler 2 Field 0 photometric data that is obtained on such targets.

We consider these targets to be of medium/low priority and easy to include in the Kepler 2 mission due to their small numbers (~50). We recommend that these stars be included in priority higher than padding the list with field stars of similar magnitude.

Thanks to the Kepler 2 Mission Team for coordinating these proposals.

References

"The new version of Binary star database (BDB)" 2012, Kaygorodov P., Debray B., Kolesnikov N., Kovaleva D., Malkov O. *Baltic Astronomy*, 21, 309.